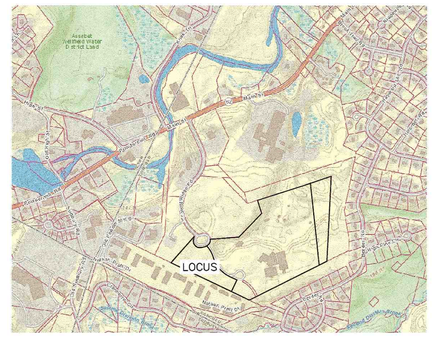
CONCORD ASSESSOR DATA:
A PORTION OF MAP 12B PARCEL 2970-1-5

OWNER:
Todd A. Pulis, Trustee of the Thoreau Realty Trust
275 Forest Ridge Road
Concord, MA 01742



LOCUS
SCALE: 1" = 1,000'±

LOT 4A
5.79± ACRES

BOTTOM DRAIN
LOW VENTS
HIGH VENT
PRIMARY LEACHING FACILITY
RESERVE LEACHING FACILITY
PROPOSED D-BOX W/TEE & FLOW LEVELERS
APPROX. MASS DEP ZONE II
APPROX. GW DISTRICT
(2) 2" FORCEMAINS
SMH 1
SMH 2
SMH 3
SMH 4
SMH 5
SMH 6
SMH 7
SMH 8
SMH 9
SMH 10
S.T.#1
S.T.#2
PUMP
GARAGE SLAB
DECK
CROSSWALK
EMH
PERC C
CLF 6'H
PROPERTY LINE
T.O.C.=214.0
T.O.C.=216.0
T.O.C.=212.0

NOTES

1. UNDERGROUND UTILITIES SHOWN ON THIS PLAN MAY BE FROM RECORD INFORMATION OR FROM DIG SAFE MARKING OR MAY BE SHOWN IN AN ESTIMATED LOCATION. THEY ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. OTHER UTILITIES MAY EXIST. ANYONE DIGGING ON THIS SITE MUST CONTACT DIG SAFE AT 1-888-344-7233 BEFORE STARTING WORK.
2. SOILS ONSITE ARE MAPPED AS MERRIMAC FINE SANDY LOAM(CLASS A). NO GROUND WATER WAS OBSERVED DURING ONSITE SOIL TESTING. PERCOLATION TESTS FOR THE SEPTIC SYSTEM WERE LESS THAN 2-MPI.
3. THE SITE IN NOT LOCATED WITHIN A NATURAL HERITAGE ESTIMATED OR PRIORITY HABITAT(MASSGIS 2016).
4. THERE ARE NO WETLANDS ONSITE OR WITHIN 100' OF THE SITE.
5. SEE SITE PLANS (C-6) FOR DRIVEWAY PROFILE WITH SEWER COLLECTION SYSTEM DETAILS, INCLUDED IN THE SUBMISSION PACKAGE.
6. MADEP ZONE 2 AND CONCORD GROUNDWATER PROTECTION DISTRICTS SHOWN ARE FROM MASSGIS AND CONCORD GIS RESPECTIVELY.

COMMONWEALTH OF MASSACHUSETTS
JOHN E. BOARDMAN
CIVIL
No. 40889
REGISTERED PROFESSIONAL ENGINEER
4-14-17

SEPTIC PLAN 1

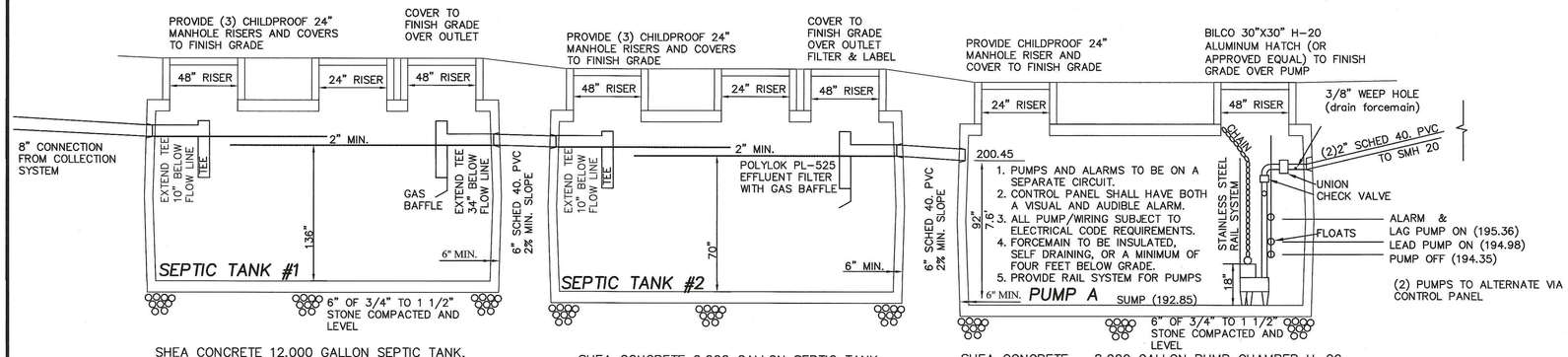
LOCATION: Black Birch 2, Forest Ridge Rd
TOWN: CONCORD, MASSACHUSETTS
PREPARED FOR:

ABODE BUILDERS OF NEW ENGLAND

SCALE: 1"= 20' DATE: April 2017

Places Associates, Inc.
Planning, Landscape Architecture, Civil Engineering, Surveying
256 GREAT ROAD, SUITE 4
LITTLETON, MA 01460
978.486.0334 Ph.
978.486.0447 Fax
places@placesassociates.com

PROJECT No.: 6610 PLAN No. SDS-1



SHEA CONCRETE 12,000 GALLON SEPTIC TANK, H-20, PRECAST CONCRETE, TO BE MADE WATER TIGHT (17'x10')

SHEA CONCRETE 6,000 GALLON SEPTIC TANK, H-20, PRECAST CONCRETE, TO BE MADE WATER TIGHT (17'x10')

SHEA CONCRETE – 8,000 GALLON PUMP CHAMBER H-20, 2 PIECE, PRECAST CONCRETE, TO BE MADE WATER TIGHT (17'x10')

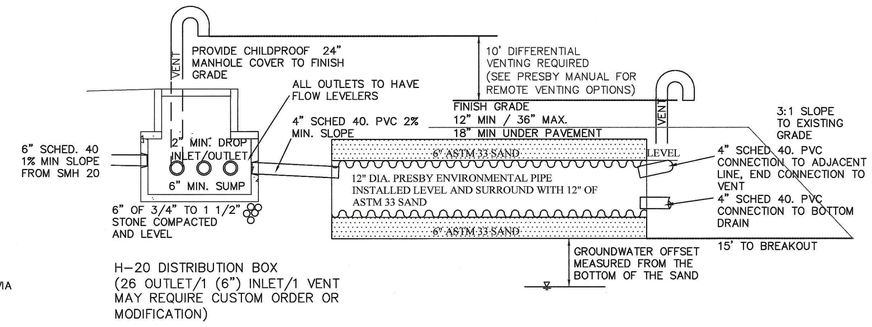
(2) PUMPS MEYER-WHR10 (1.0HP) PUMPS OR APPROVED EQUAL
8 DOSES PER DAY @ 660GAL./DOSE
7.6" PER DOSE (0.63')
7.6"/92" X 8,000 = 666 GALLONS

24 HOUR EMERGENCY STORAGE – 61" MIN.
61" / 92" X 8,000 = 5,280 GALLONS

PUMPS AND OTHER ELECTRICAL CONTROLS SHALL BE INSTALLED BY A MASSACHUSETTS LICENSED ELECTRICIAN ONLY AFTER AN ELECTRICAL PERMIT HAS BEEN GRANTED BY THE TOWN OF CONCORD BUILDING AND INSPECTIONS DIVISION.

TANKS AND PUMP CHAMBER

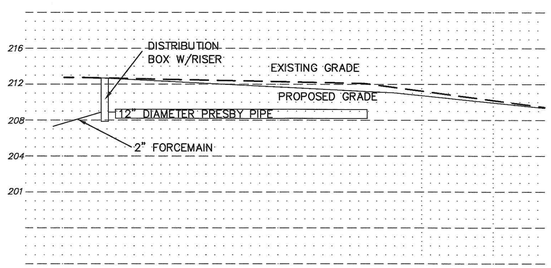
NOT TO SCALE



H-20 DISTRIBUTION BOX
(26 OUTLET/1 (6") INLET/1 VENT
MAY REQUIRE CUSTOM ORDER OR MODIFICATION)

DISTRIBUTION BOX AND LEACHING FIELD

NOT TO SCALE



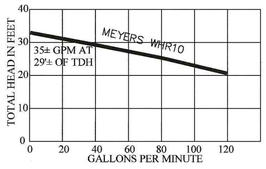
SEE SITE PLANS, SHEET C-6 FOR COLLECTION SYSTEM PROFILES

SYSTEM PROFILE

HORIZONTAL 1" = 20'
VERTICAL 1" = 8'

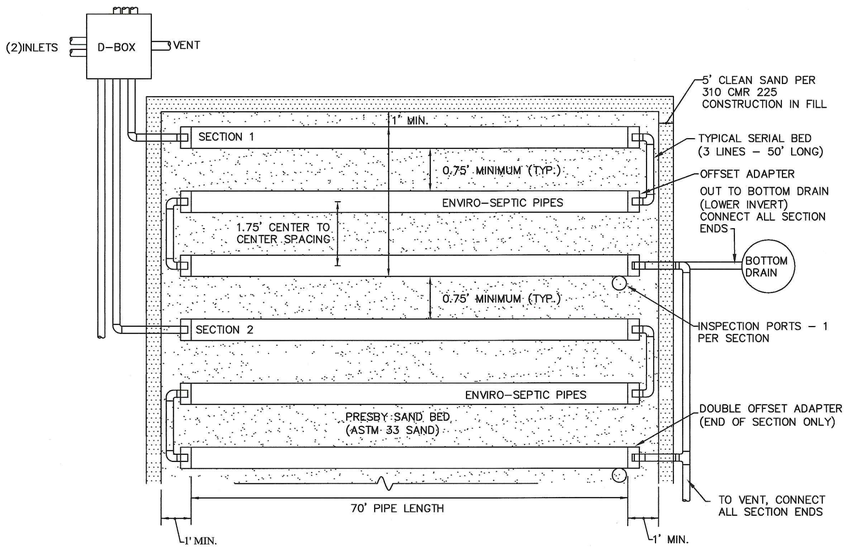
SCHEDULE OF ELEVATIONS

LOCATION	PROPOSED
SEPTIC TANK #1 IN	201.39
SEPTIC TANK #1 OUT	201.14
SEPTIC TANK #2 IN	200.78
SEPTIC TANK #2 OUT	200.53
PUMP IN	200.45
D-BOX IN	209.77
D-BOX OUT	209.60
4" INTO LEACHING	208.78
TOP OF 12" PIPE	209.20
BOTTOM OF 12" PIPE	208.20
BREAKOUT ELEV.	208.20
BOTTOM OF SAND	207.70
E.S.H.W.T.	>165.0
REQUIRED GW OFFSET	5.0'
MOUNDING	2.96'±
OFFSET PROVIDED	42'±'



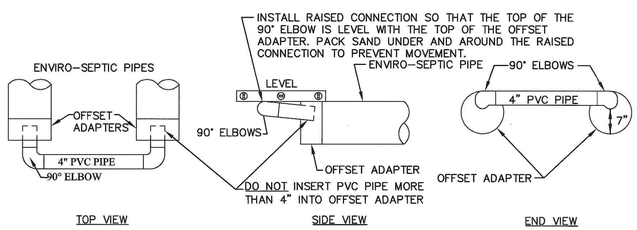
PUMP CURVE

NOT TO SCALE



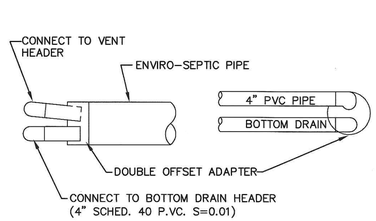
TYPICAL SYSTEM DETAIL, PLAN VIEW

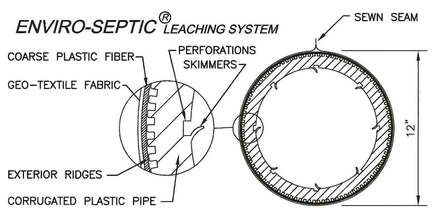
NOT TO SCALE



CONNECTION DETAILS

NOT TO SCALE

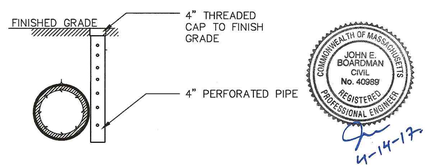




ENVIRO-SEPTIC US PATENTS 5,954,451; 5,606,786 CANADIAN PATENT 2,185,087; OTHER PATENTS PENDING

PRESBY ENVIRO-SEPTIC

NOT TO SCALE



INSPECTION PORT DETAIL

NOT TO SCALE

COMMONWEALTH OF MASSACHUSETTS
JOHN E. BOARDMAN
CIVIL
No. 40989
REGISTERED PROFESSIONAL ENGINEER
4-14-17

SEPTIC DETAILS 1

LOCATION: Black Birch II, Forest Ridge Rd
TOWN: CONCORD, MASSACHUSETTS
PREPARED FOR:

ABODE BUILDERS OF NEW ENGLAND

SCALE: AS SHOWN DATE: April 2017

Places Associates, Inc.
Planning, Landscape Architecture, Civil Engineering, Surveying
256 GREAT ROAD, SUITE 4
LITTLETON, MA 01460
978.486.0334 Ph.
978.486.0447 Fax
places@placesassociates.com

PROJECT No.: 6610 PLAN No. SDS-2

GENERAL NOTES:

THE SOIL ABSORPTION SYSTEM IS DESIGNED TO ACCOMMODATE SANITARY SEWAGE DERIVED FROM DOMESTIC USAGE THAT IS COMPRISED OF WATER CARRIED PUTRESIBLE WASTES ONLY.

THE CONTRACTOR SHALL NOTIFY "DIG-SAFE" PRIOR TO ANY ON SITE EXCAVATION.

THE OWNER SHALL VERIFY COMPLIANCE WITH ZONING REGULATIONS PRIOR TO CONSTRUCTION.

THE PROPERTY LINES AND TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN ARE A RESULT OF AN ON THE GROUND TOPOGRAPHIC SURVEY PERFORMED BY PLACES ASSOC. THIS PLAN SHOWS ONLY THOSE FEATURES THAT WERE VISUALLY APPARENT ON THE DATE OF TOPOGRAPHY. THE ABSENCE OF SUBSURFACE STRUCTURES, UTILITIES, ETC. IS NOT INTENDED NOR IS IT IMPLIED.

THE LOCATION OF ANY INDICATED SUBSURFACE UTILITIES ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL OBTAIN ADEQUATE LOCATION INFORMATION FROM THE APPLICABLE UTILITY COMPANY .

PRIOR TO ANY CONSTRUCTION, A TEMPORARY BENCHMARK SHALL BE SET WITHIN 50' TO 75' OF THE PROPOSED SOIL ABSORPTION AREA.

WETLANDS PROTECTION ACT HAS REQUIREMENTS WHICH MAY AFFECT THE WORK PROPOSED HEREIN. PRIOR TO ANY REMOVAL OF SOILS OR VEGETATION WITHIN 100' OF ANY WETLAND OR WITHIN 200' OR ANY RIVER BANK (ANY AREAS PROTECTED BY C130 §40) A REQUEST FOR DETERMINATION OF APPLICABILITY OR A NOTICE OF INTENT MUST BE FILED WITH THE CONSERVATION COMMISSION. ADDITIONAL LOCAL BYLAWS MAY ALSO APPLY.

THERE ARE NO EXISTING PRIVATE WELLS WITHIN 100' OF THE PROPOSED SEWAGE DISPOSAL SYSTEM, 50' OF THE PROPOSED SEPTIC TANK(S).

ALL KNOWN WELLS WITHIN 150' OF THE PROPOSED PRIMARY AND EXPANSION LEACH SOIL ABSORPTION AREAS ARE SHOWN.

THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER PROMPTLY OF ANY PLAN DEFICIENCIES OR OTHER UNFORESEEN CONDITIONS WHICH MAY IMPACT THE FUNCTION OF THE COMPLETED SYSTEM PRIOR TO CONSTRUCTION.

DEVIATIONS FROM THE PLAN REQUIREMENTS OR DESIGN DURING CONSTRUCTION AND OPERATION OF THE PROPOSED SYSTEM SHALL VOID ANY CERTIFICATION OR REPRESENTATIONS MADE RELATIVE TO THE SUBSURFACE SEWAGE DISPOSAL SYSTEM.

MATERIAL SPECIFICATIONS:

ALL TANKS, D-BOXES, CHAMBERS AND TRAPS SHALL BE WATERTIGHT THROUGH THE MANUFACTURER'S SPECIFICATION OR WARRANTY.

ALL TANKS, CHAMBERS AND TRAPS SHALL BE EQUIPPED WITH TWENTY INCH MINIMUM DIAMETER WATERTIGHT ACCESS MANHOLE(S).

ALL TANKS, D-BOXES, CHAMBERS, TRAPS, COVERS, ACCESS MANHOLE AND PIPING SHALL BE ABLE TO WITHSTAND AN H-20 LOAD. H-20 LOADING CERTIFICATION FROM THE COMPONENT MANUFACTURER IF REQUIRED.

ALL TANKS, D-BOXES, CHAMBERS AND TRAPS SHALL BE PRECAST REINFORCED CONCRETE.

ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS.

CEMENT SHALL BE PORTLAND TYPE I OR III PER ASTM C150-81.

ALL CONCRETE ADMIXTURES SHALL BE PER ASTM C233-82.

ALL CONCRETE REINFORCEMENT SHALL BE WIRE FABRIC, GRADE 40/60 REQ'D PER ASTM A615.

THE SEPTIC TANK SHALL BE EMBOSSED WITH A SEAL STATING COMPLIANCE WITH ASTM C1227093.

THE MINIMUM REINFORCED CONCRETE WALL THICKNESS IS THREE INCHES EXCEPT FOR D-BOXES WHICH IS TWO INCH MINIMUM.

ALL SYSTEM COMPONENTS SHALL BE CONSTRUCTED WITH CORROSION RESISTANT MATERIAL.

ALL PIPING SHALL BE POLYVINYL CHLORIDE (PVC) ASTM 26655 SCHEDULE 40 NSF.

THE BUILDING SEWER SHALL COMPLY WITH THE STATE PLUMBING CODE, 248 CMR 2.00.

ALL SYSTEM COMPONENTS SHALL BE MARKED WITH MAGNETIC MARKING TAPE OR A COMPARABLE MEANS TO LOCATE THEM WHEN BURIED.

SEPTIC TANK NOTES:

THE INLET AND OUTLET TEES SHALL BE LOCATED ON THE CENTER LINE OF THE TANK, DIRECTLY UNDER THE TEE ACCESS MANHOLES.

THE TOP OF THE INLET AND OUTLET TEES SHALL BE AT LEAST THREE INCHES BELOW THE INSIDE TOP OF TANK.

THE OUTLET TEE SHALL BE FITTED WITH AN EFFLUENT FILTER.

THE INLET PIPE INVERT SHALL BE AT LEAST TWO INCHES BUT NOT MORE THAN THREE INCHES ABOVE THE OUTLET PIPE INVERT.

THE INLET TEE SHALL EXTEND TEN INCHES BELOW THE OUTLET PIPE INVERT.

THE OUTLET TEE SHALL EXTEND 14 INCHES BELOW THE OUTLET PIPE INVERT PLUS 5 ADDITIONAL INCHES FOR EVERY FOOT OF TANK DEPTH IN EXCESS OF FOUR FEET.

SEPTIC TANKS SHALL HAVE AT LEAST NINE INCHES OF EARTHEN COVER.

THE DEPTH OF LIQUID BELOW THE INVERT OF THE OUTLET TEE SHALL BE FOUR FEET MINIMUM.

AT LEAST THREE 20-INCH MINIMUM DIAMETER ACCESS MANHOLES SHALL BE PROVIDED IN THE TANK COVER. ACCESS MANHOLES SHALL BE LOCATED ON THE CENTER LINE ABOVE EACH INLET AND OUTLET TEE AND AT THE TANK CENTER.

AT LEAST ONE ACCESS MANHOLE SHALL BE BROUGHT TO WITHIN SIX INCHES OF FINISHED GRADE. FOR SEPTIC SYSTEMS WITH TWO TANKS, EACH INLET AND OUTLET MANHOLE SHALL BE BROUGHT TO WITHIN SIX INCHES OF FINISHED GRADE AND A MANHOLE TO GRADE OVER THE EFFLUENT FILTER. MANHOLES BROUGHT TO FINISHED GRADE SHALL BE MADE SECURE TO PREVENT UNAUTHORIZED ACCESS.

NO STRUCTURES OR OTHER FEATURE SHALL BE LOCATED OVER OR NEAR THE TANK SO AS TO ALLOW REQUIRED INSPECTION AND MAINTENANCE.

SYSTEM VENT NOTES:

THE SYSTEM SHALL BE VENTED THROUGH THE BUILDING STACK VENT WHERE POSSIBLE.

WHEN ADDITIONAL SYSTEM VENTS ARE INDICATED OR REQUIRED, THEY SHALL BE CONSTRUCTED WITH THE SAME PIPING SIZE AND MATERIAL, LOCATED SO AS TO PREVENT THE ENTRANCE OF ANIMALS OR PRECIPITATION AND BACKFILLED TIGHTLY TO PREVENT THE MIGRATION OF SURFACE WATER INTO THE SOIL ABSORPTION SYSTEM.

INNOVATIVE/ALTERATIVE SYSTEM NOTES

1. THE SYSTEM INSTALLER SHALL BE CERTIFIED TO INSTALL THE LEACHING SYSTEM BY THE MANUFACTURER.
2. THE INSTALLER SHALL PROVIDE PROOF THAT ASTM-33 SAND WAS INSTALLED.
3. INSTALLER TO COMPLETE AND SUBMIT "SYSTEM INSTALLATION FORM".
4. THE SYSTEM OWNER SHALL HAVE THE SYSTEM INSPECTED ANNUALLY BY AN OPERATOR TRAINED BY THE MANUFACTURER AND SHALL SUBMIT THE RESULTS OF THAT INSPECTION, ON A TECHNOLOGY CHECKLIST, TO THE BOARD OF HEALTH.
5. PRIOR TO REQUESTING A CERTIFICATE OF COMPLIANCE FROM THE BOARD OF HEALTH, THE SYSTEM OWNER SHALL PROVIDE A COPY OF THE REQUIRED MAINTENANCE AGREEMENT WITH A QUALIFIED SYSTEM INSPECTOR FOR ALL OF THE REQUIRED INSPECTIONS. THE MAINTENANCE AGREEMENT SHALL INCLUDE BUT NOT BE LIMITED TO ROUTINE ASSESSMENTS OF THE ENTIRE SYSTEM, CLEANING FILTERS.

CONSTRUCTION NOTES:

CONSTRUCTION VEHICLES SHALL BE KEPT OFF THE AREA TO BE USED AS THE SOIL ABSORPTION AREA PRIOR TO, DURING AND AFTER CONSTRUCTION.

FROM THE DATE OF INSTALLATION OF THE SOIL ABSORPTION SYSTEM, UNTIL THE RECEIPT OF A CERTIFICATE OF COMPLIANCE FROM THE LOCAL BOARD OF HEALTH, THE PERIMETER OF THE SOIL ABSORPTION SYSTEM SHALL BE STAKED AND FLAGGED, TO PREVENT THE USE OF THE AREA FROM ANY AND ALL ACTIVITIES WHICH MIGHT DAMAGE THE SOIL ABSORPTION SYSTEM. THE STOCKPILING OF MATERIALS OR EQUIPMENT WITHIN THE AREA IS PROHIBITED.

ALL LOAM, SUBSOIL, LARGE BOULDERS AND FOREIGN MATERIAL ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED.

THE SOIL ABSORPTION AREA (LEACHING AREA) BOTTOM SHALL BE EXCAVATED TO A LEVEL RELATIVELY DRY SCARIFIED SURFACE AT A GRADE EQUAL TO THAT INDICATED FOR THE BOTTOM OF STONE.

IF THE REMOVAL OF STONES OR BOULDERS RESULTS IN LOCAL DEPRESSIONS, FILLING TO GRADE WITH SUITABLE EXCAVATED PARENT MATERIAL IS ACCEPTABLE.

IF THE REMOVAL OF UNSUITABLE MATERIAL, TOP AND OR SUBSOIL IS REQUIRED CREATING AREAS BELOW THE REQUIRED BOTTOM OF STONE ELEVATION, THE PLACEMENT OF SEPTIC SYSTEM FILL IS REQUIRED.

WHEN SEPTIC SYSTEM FILL IS REQUIRED, ALL UNSUITABLE OR IMPERMEABLE SOILS WITHIN 5' LATERALLY OF THE SOIL ABSORPTION SYSTEM SHALL BE REMOVED AND SEPTIC SYSTEM FILL PLACED GRADUALLY.

FILL SHALL NOT BE PLACED DURING RAIN OR SNOW STORMS, OR CONDITIONS RESULTING IN FROZEN FILL.

AN OFFSET OF AT LEAST TEN FEET TO ANY EXISTING OR PROPOSED WATER LINE SHALL BE PROVIDED FROM ALL SYSTEM COMPONENTS.

THE BUILDING SEWER LINE SHALL BE CONSTRUCTED WITH WATER TIGHT JOINTS.

THE BUILDING SEWER SHALL BE LAID WITH A 2 PERCENT MINIMUM SLOPE (1/4 INCH PER FOOT PITCH).

THE BUILDING SEWER SHALL BE LAID ON A CONTINUOUS LINE AND GRADE OR A MANHOLE SHALL BE PROVIDED.

MANHOLES SHALL BE PROVIDED FOR ANY PIPE LENGTH IN EXCESS OF 100 FEET, EXCLUSIVE OF FORCE MAINS.

THE BUILDING SEWER SHALL BE VENTED THROUGH THE BUILDING'S VENT STACK.

THE BACKFILL ABOVE THE SOIL ABSORPTION AREA SHALL BE A MINIMUM OF NINE INCHES EXCLUDING TOPSOIL.

THE BACKFILL ABOVE THE SOIL ABSORPTION AREA SHALL BE A MINIMUM OF TWELVE INCHES INCLUDING TOPSOIL.

THE BACKFILL ABOVE THE SOIL ABSORPTION SYSTEM SHALL BE CLEAN, FREE OF STONE GREATER THAN SIX INCHES AND FREE OF TAILINGS, CLAY OR SIMILAR MATERIAL.

ALL BACKFILL SHALL BE PLACED IN LIFTS AND COMPACTED TO PREVENT SETTLING.

THE FINISHED GRADE OVER THE SOIL ABSORPTION AREA SHALL BE GRADED WITH A MINIMUM TWO PERCENT SLOPE TO REDUCE RAINFALL INFILTRATION INTO THE SYSTEM.

THE GRADING AROUND THE SOIL ABSORPTION AREA SHALL BE DONE SO AS TO DIRECT SURFACE DRAINAGE AWAY FROM THE SYSTEM.

ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED TO PREVENT EROSION.

MAX. COVER ABOVE ANY SYSTEM COMPONENT IS 36".

SYSTEM OPERATION & MAINTENANCE:

PROPER OPERATION AND MAINTENANCE IS ESSENTIAL TO THE LONG TERM FUNCTION OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS.

THE OWNER OR OPERATOR OF THE SEWAGE DISPOSAL SYSTEM IS RESPONSIBLE FOR THE INSPECTION AND MAINTENANCE OF, AND ANY UPGRADES TO, THE SYSTEM.

A SYSTEM INSPECTION BY STATE CERTIFIED PERSONNEL IS REQUIRED WITHIN TWO YEARS PRIOR TO ANY TRANSFER IN TITLE (SALE OF THE PROPERTY). AN INSPECTION WITHIN THREE YEARS PRIOR IS ALLOWED IF ACCOMPANIED WITH WRITTEN ANNUAL SYSTEM PUMPING RECORDS THE SYSTEM SHALL BE INSPECTED UPON ANY CHANGE IN USE OR EXPANSION FOR WHICH A BUILDING PERMIT OR OCCUPANCY PERMIT IS REQUIRED FROM THE LOCAL BUILDING INSPECTOR.

THE SYSTEM SHALL BE INSPECTED PRIOR TO THE SALE OF ANY PORTION OF THE PROPERTY (ANR PLAN OR SUBDIVISION).

THE RESULTS OF REQUIRED INSPECTIONS SHALL BE SUBMITTED TO THE LOCAL BOARD OF HEALTH WITHIN THIRTY DAYS BY THE APPROVED SYSTEM INSPECTOR.

EVERY SEPTIC TANK SHALL BE PUMPED WHENEVER NECESSARY TO ENSURE PROPER SYSTEM FUNCTION.

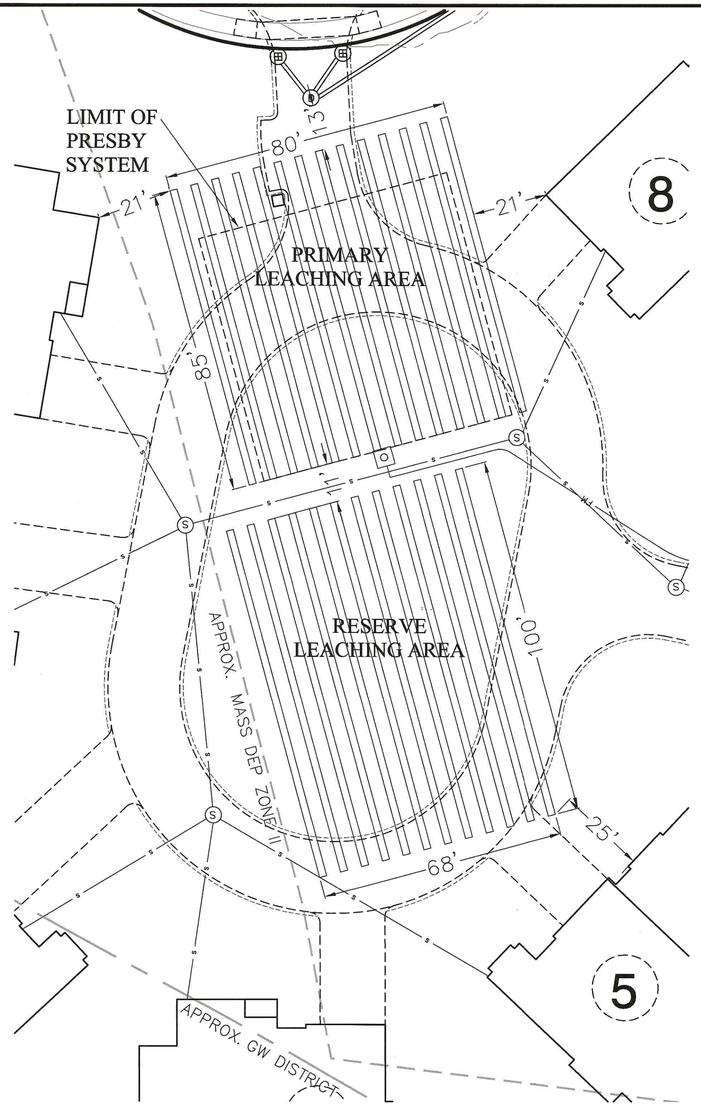
THE SEPTIC TANK SHALL BE PUMPED WHEN THE TOP OF THE SLUDGE LAYER IS WITHIN TWELVE INCHES OF THE BOTTOM OF THE OUTLET TEE.

THE SEPTIC TANK SHALL BE PUMPED WHEN THE TOP OF THE SCUM LAYER IS WITHIN TWO INCHES OF THE TOP OF THE OUTLET TEE OR WHEN THE BOTTOM OF THE SCUM LAYER IS WITHIN TWO INCHES OF THE BOTTOM OF THE OUTLET TEE.

ALL SYSTEMS ARE DIFFERENT, THEREFORE IT IS RECOMMENDED THAT THE PUMPING FREQUENCY BE ADJUSTED TO OCCUR WHEN THE SLUDGE DEPTH IS NOT MORE THAN ONE QUARTER THE DESIGN LIQUID DEPTH. PUMPING SHALL OCCUR NOT MORE THAN THREE YEARS APART.

SEPTIC SYSTEM FILL SHALL CONSIST OF CLEAN GRANULAR SAND, FREE FROM ORGANIC MATTER AND DELETERIOUS SUBSTANCES MIXTURES OF DIFFERENT CLASS SOILS IS NOT ALLOWED. THE FILL SHALL NOT CONTAIN ANY PARTICLE GREATER THAN TWO INCHES IN SIZE. A SIEVE ANALYSIS USING A #4 SIEVE SHALL BE PERFORMED ON A REPRESENTATIVE SAMPLE OF THE FILL UP TO 45% BY WEIGHT OF THE FILL SAMPLE MAY BE RETAINED ON THE #4 SIEVE. ADDITIONAL SIEVE ANALYSIS SHALL BE PERFORMED ON THE PORTION PASSING THE #4 SIEVE. THE MATERIAL PASSING THE #4 SIEVE MUST MEET THE FOLLOWING CRITERIA:

SIEVE SIZE	EFFECTIVE PARTICLE SIZE	% PASSING SIEVE
# 4	4.75 mm	100
# 50	0.30 mm	10-100
# 100	0.15 mm	0-20
# 200	0.075 mm	0-5



STANDARD TITLE 5 SYSTEM
1" = 20'

STANDARD TITLE 5 SIZING

DAILY FLOW: (16) THREE BEDROOM UNITS =5,280 GPD

PERCOLATION RATE = 2 MINUTES PER INCH
LEACHING REQUIREMENTS: 0.74 GPD/SF (CLASS 1 SOILS)
TITLE 5 LEACHING REQUIREMENT:
5,280 / 0.74 = 7,135 SQ.FT

STANDARD TITLE 5 SYSTEM
PRIMARY
USE (14) 2'X2' TRENCHES WITH SEPARATE RESERVE
TRENCH LENGTH = 85'
14 TRENCHES X 85' X 6 = 7,140 SQ.FT.

RESERVE
USE (12) 2'X2' TRENCHES
TRENCH LENGTH = 100'
12 TRENCHES X 100' X 6 = 7,200 SQ.FT.

I/A DESIGN CALCULATIONS

TASK 1
DAILY FLOW: (16) THREE BEDROOM UNITS =5,280 GPD
PERCOLATION RATE = 2 MINUTES PER INCH
LEACHING REQUIREMENTS: 50' PER BEDROOM
48 BEDROOM X 50' = 2,400' OF PIPE

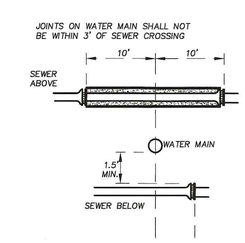
TASK 2
SLOPE ON SYSTEM IS 0%

TASK 3
REQUIRED CENTER TO CENTER SPACING IS 1.5'
INCREASE TO 1.75' TO PROVIDE MINIMUM BED AREA.

TASK 4
PIPE LAYOUT IS 2 FIELDS OF 70' X 30.75'
6 SECTIONS X 3 PIPES PER SECTION X 70' =1,260 FEET
1,260' X 2 FIELDS = 2,520' OF PIPE, (2,400 REQUIRED.)

TASK 5
FIELD LENGTH = 70' + 2' SAND = 72'
FIELD WIDTH = 30.75' + 2' SAND = 32.75'
FIELD AREA = 72' X 32.5' = 2,340 SQ.FT.
2 FIELDS = 4,680 SQ.FT. TOTAL AREA

TITLE 5 REQUIRED AREA = 11,149 SQ.FT.
(7,135 - 4,680)/7,135 X 100 = 35% (40% ALLOWED)



NOTES
WHEREVER POSSIBLE, WATER SERVICES SHALL BE INSTALLED WITH A MINIMUM OF 10 FEET HORIZONTAL SEPARATION FROM SEWER SERVICES AND DRAINS. ENCASEMENT OF EITHER THE WATER OR SEWER SERVICE IS REQUIRED IN THE FORM OF A 10-FOOT SLEEVE ON EITHER SIDE OF THE ADJACENT STRUCTURE IN THE FOLLOWING CASES:

1) THE MINIMUM 10-FOOT HORIZONTAL SEPARATION SEWER SERVICES AND DRAINS CANNOT BE MET;

2) THE TOP OF THE SEWER BELL IS LESS THAN 1.5 FEET FROM THE BOTTOM OF THE WATER LINE;

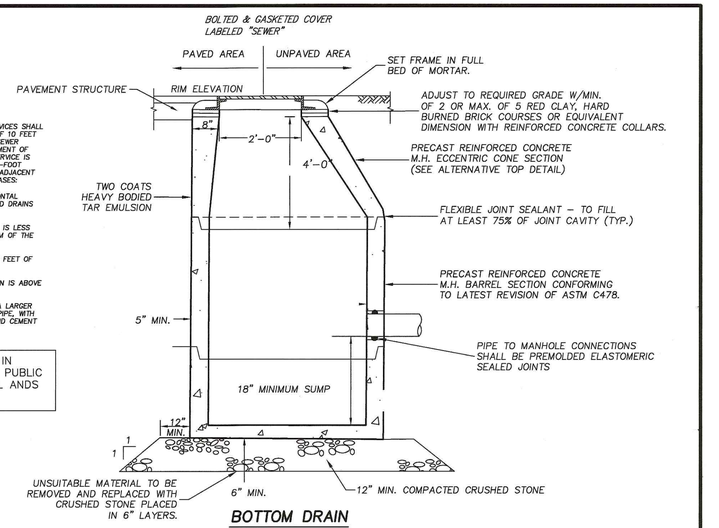
3) A STORM DRAIN IS WITHIN 1.5 FEET OF THE WATER LINE; OR,

4) A SEWER MAIN OR CONNECTION IS ABOVE WATER MAIN OR CONNECTION.

THE SLEEVE SHALL CONSIST OF A LARGER PIPE SURROUNDING THE UTILITY PIPE, WITH FILL BETWEEN THE TWO PIPES AND CEMENT AT THE ENDS.

SEWER LINE CROSSING-WATER LINE
NOT TO SCALE

ALL WATER COMPONENTS TO BE IN COMPLIANCE WITH THE CONCORD PUBLIC WORKS WATER DIVISION MATERIAL ANDS INSTALLATION REQUIREMENTS



BOTTOM DRAIN
NOT TO SCALE

SOIL TESTING FOR SEPTIC DESIGN

PERFORMED BY: John Boardman P.E.
WITNESSED BY: Stanley Sosnicki, Concord BOH

Testhole # 1116-1 DATE: 11-1-16 Elevation: 211.9

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-12'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >144" Elevation: >199.9
PERC A @ 48" , 2 MINUTES PER INCH

Testhole # 1116-2 DATE: 11-1-16 Elevation: 212.4

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-10'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >120" Elevation: >202.4

Testhole # 1116-3 DATE: 11-1-16 Elevation: 212.2

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-12'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >144" Elevation: >200.2

Testhole # 1116-4 DATE: 11-1-16 Elevation: 212.2

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-12'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >144" Elevation: >200.2
PERC B @ 48" , 2 MINUTES PER INCH

Testhole # 1116-5 DATE: 11-1-16 Elevation: 211.6

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-12'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >144" Elevation: >199.6
PERC C @ 48" , 2 MINUTES PER INCH

Testhole # 1116-6 DATE: 11-1-16 Elevation: 211.8

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-12'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >144" Elevation: >199.8

Testhole # 1116-7 DATE: 11-1-16 Elevation: 211.2

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-12'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >144" Elevation: >199.2

Testhole # 1116-8 DATE: 11-1-16 Elevation: 211.4

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-6"	Ap	SANDY LOAM	10YR 3/1	NONE	
6-12"	Bw	LOAMY SAND	10YR 6/6	NONE	
12"-12'	C1	layered sand & gravel/cobbles	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >144" Elevation: >199.4
PERC D @ 48" , 2 MINUTES PER INCH

SOIL TESTING FOR STORMWATER DESIGN (KETTLEHOLE)

PERFORMED BY: JOHN BOARDMAN P.E.

Testhole # 1116-10 DATE: 11/3/16 Elevation: 175±

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-48"		SAND/TOPSOIL MIX-DISTURBED			
48-120"	C	BONEY GRAVEL	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >120" Elevation: >165.0

Testhole # 1116-11 DATE: 11/3/16 Elevation: 175±

Depth from Surface (inches)	Soil Horizon	Soil texture (USDA)	Soil Color (Munsel)	Soil Mottling	Other
0-60"		SAND/TOPSOIL MIX-DISTURBED			
60-96"	C	BONEY GRAVEL	10YR 5/6	NONE	

Groundwater Observed: NONE Refusal @ NONE
Estimated Seasonal High Groundwater: >96" Elevation: >167.0

MOUNDING ANALYSIS

Results of Groundwater Mounding Calculation 12-1-16
AQTESOLV - HANTOUSH METHOD

Solution by Successive Approximation

	b	hm*	% Change
1	10	12.8846051094365	28.8460510943 65
2	11.4423025547182	12.9645424488429	0.62040969612 4979
3	11.4822712244214	12.9663909691962	1.42582768392518E-02
4	11.4831954845981	12.9664336376535	3.29069849751546E-04
5	11.4832168188268	12.9664346225064	7.59540297323724E-06

K	s	hi	Length	Width	t
8	0.23	10	72	73.5 .133	90

maximum water-table rise (hm - hi) at time t = 90 is 2.96 feet

COMMONWEALTH OF MASSACHUSETTS
JOHN E. BOARDMAN
CIVIL
No. 40989
REGISTERED PROFESSIONAL ENGINEER
4-14-17

SEPTIC DETAILS 2

LOCATION: *Black Birch II, Forest Ridge Rd*
TOWN: *CONCORD, MASSACHUSETTS*
PREPARED FOR:

ABODE BUILDERS OF NEW ENGLAND

SCALE: AS SHOWN DATE: April 2017

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